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## Neuropsychiatry and behavioral neurology: Novel risk factors and novel approaches to risk in dementia

## The impact of hearing loss on cognitive decline and risk of progression to mild cognitive impairment in healthy adults

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## Abstract

**Background:** Hearing loss is the third most commonly reported chronic disease in older adults. Its prevalence ranges from 30% in individuals aged 65-74 years to 40%-60% in those aged 75 years or older. Evidence suggests that age-related hearing impairment is strongly and independently associated with the decline in cognitive abilities and that individuals with hearing loss develop cognitive decline earlier than people with normal hearing. In this study, we used data from a large referral-based cohort to investigate the effect of hearing impairment on cognitive decline and progression to mild cognitive impairment (MCI) in healthy adults.

**Method:** The longitudinal National Alzheimer's Coordinating Center (NACC) Uniform Data Set (UDS), consisting of observations from the period 2005-2018, was used to assess the impact of hearing loss on cognition and conversion to MCI in cognitively healthy individuals. The incidence of MCI was determined based on the clinical diagnosis. The analytic sample for this study included 691 participants (age >40) with hearing impairment. Kaplan-Meier survival functions were used to estimate the distribution of survival times for patient subpopulations i.e. patients with and without hearing impairment. The survival duration was defined as the number of years between the baseline 'healthy' diagnosis and the first MCI diagnosis during the follow-up. Cox proportional hazards regression model was developed to study time to incident MCI. Sensitivity analysis was performed to control for confounding.

**Result:** Patients diagnosed with hearing impairment were at substantially higher risk of converting to MCI (hazard ratio [HR] 1.3; 95%CI, 1.07-1.55;  $p = 0.008$ ). Kaplan-Meier analysis for the cumulative risk of MCI revealed large differences in survival rates by hearing impairment status ( $p = 0.0003$ ). Sensitivity analysis confirmed the robustness of our findings. The results obtained after propensity score matching again showed a significant association between hearing impairment and risk of conversion to MCI (HR 1.43; 95%CI, 1.14-1.80;  $p = 0.002$ ).

**Conclusion:** We demonstrated the impact of hearing loss on cognition of healthy individuals. Future work will focus on evaluating the relationship between the use of hearing aids and conversion to MCI in hearing-impaired healthy adults as well as investigating the mechanistic basis of this association.